WHAT IS CLAIMED IS:

1. A method of converting power from an input source for delivery to a load, where the load may vary over a normal operating range, comprising:

providing an array of two or more VTMs, the array having an input for receiving power from the input source and an output for delivering power to the load;

each VTM having an input, an output, and a substantially fixed voltage transformation ratio, $K = V_{out}/V_{in}$, over the normal operating range, where V_{in} is the voltage across the respective VTM input and V_{out} is the voltage across the respective VTM output, and providing isolation between its input and its output;

adaptively configuring the VTMs in and out of a series connection to adaptively adjust the aggregate voltage transformation ratio of the array and regulate the output voltage.

2. The method of claim 1 wherein the inputs of the VTMs are adaptively configured.

3. The method of claim 1 wherein the outputs of the VTMs are adaptively configured.

4. The method of claim 1 further comprising:

providing, in one or more of the VTMs, a method of converting power comprising:

forming a resonant circuit including a transformer and having a characteristic resonant frequency and period;

providing two or more primary switches to drive the resonant circuit; and

providing a switch controller to operate the primary switches in a series of converter operating cycles, each converter operating cycle characterized by

(a) two power transfer intervals of essentially equal duration, during which one or more of the primary switches are ON and power is transferred from the input of the VTM to the output of the VTM via the transformer, and voltages and currents in the VTM rise and fall at the characteristic resonant frequency.

5. The method of claim 4 wherein:

each converter operating cycle is further characterized by (b) two energy-recycling intervals each having an essentially constant duration over the normal operating range during which the primary switches are OFF; and

the method of converting power further comprises using magnetizing current to charge and discharge capacitances during the energy-recycling intervals.

6. The method of claim 5 wherein the method of converting power further comprises using the switch controller to turn the primary switches OFF essentially at times when the current in a secondary winding returns to zero.

7. The method of claim 1 further comprising sensing the array input voltage and wherein the adaptive configuring is in response to changes in the array input voltage.

8. The method of claim 1 or 7 further comprising sensing the array output voltage and wherein the adaptive configuring is in response to changes in the array output voltage.

9. The method of claim 1 wherein the array comprises VTMs having voltage transformation ratios that form a binary series.

10. The method of claim 1 wherein

the array comprises a main VTM and an auxiliary VTM;

the main VTM having fixed connections to the array input and output; and

the auxiliary VTM being adaptively configured between a series-connection with the main VTM or disconnected from the array.

11. The method of claim 1 further comprising providing a linear regulator between the array output and the load.

12. The method of claim 1 further comprising providing a linear regulator between the input source and the array input.

13. A method of converting power from an input source for delivery to a load, where the load may vary over a normal operating range, comprising:

providing an integrated adaptive array having an input, an output, a number, N, of input cells each having a respective number, P_x, of turns and a number, M, of output cells each having a respective number, S_x, of turns, where N+M is greater than 2;

providing magnetic coupling between the turns to form a transformer common to each of the input and output cells;

adaptively configuring the cells in and out of a series connection such that the turns of selected ones of the input cells are adaptively connected in series and the turns of selected ones of the output cells are adaptively connected in series to provide an adaptively adjustable transformer turns ratio, which is a function of the ratio of (a) the sum of the number of turns in the selected ones of the series-connected output cells to (b) the sum of the number of turns in the selected ones of the series-connected input cells.

14. The method of claim 13 wherein the number, M, of output cells equals 1.

15. The method of claim 13 wherein the number, N, of input cells equals 1.

16. The method of claim 13 further comprising

providing, in the integrated adaptive array, a method of converting power comprising:

forming a resonant circuit including the transformer and having a characteristic resonant frequency and period;

providing two or more primary switches in at least one of the primary cells to drive the resonant circuit; and

providing a switch controller to operate the primary switches in a series of converter operating cycles, each converter operating cycle characterized by

(a) two power transfer intervals of essentially equal duration, during which one or more of the primary switches are ON and power is transferred from the input of the integrated adaptive array to the output of the integrated adaptive array via the transformer, and voltages and currents in the integrated adaptive array rise and fall at the characteristic resonant frequency.

17. The method of claim 16 wherein:

each converter operating cycle is further characterized by (b) two energy-recycling intervals each having an essentially constant duration over the normal operating range during which the primary switches are OFF; and

the method of converting power further comprises using magnetizing current to charge and discharge capacitances during the energy-recycling intervals.

18. The method of claim 17 wherein the method of converting power further comprises using the switch controller to turn the primary switches OFF essentially at times when the current in a secondary winding returns to zero.

19. The method of claim 13 further comprising sensing the integrated adaptive array input voltage and wherein the adaptive configuring is in response to changes in the integrated adaptive array input voltage.

20. The method of claim 13 or 19 further comprising sensing the integrated adaptive array output voltage and wherein the adaptive configuring is in response to changes in the integrated adaptive array output voltage.

21. The method of claim 13 wherein the input or output cells comprise a number of turns that form a binary series.

22. The method of claim 13 further comprising a main input cell having a fixed connection to the integrated adaptive array input.

23. The method of claim 22 further comprising an auxiliary input cell being adaptively configured between a series-connection with the main input cell or disconnected from the integrated adaptive array input.

24. The method of claim 13 further comprising providing a linear regulator between the integrated adaptive array output and the load.

25. The method of claim 13 further comprising providing a linear regulator between the input source and the integrated adaptive array input.

26. Apparatus for converting power from an input source for delivery to a load, where the load may vary over a normal operating range, comprising:

an array of two or more VTMs, the array having an input for receiving power from the input source and an output for delivering power to the load;

each VTM having an input, an output, and a substantially fixed voltage transformation ratio, $K = V_{out}/V_{in}$, over the normal operating range where V_{in} is the voltage across the respective VTM input and V_{out} is the voltage across the respective VTM output, and providing isolation between its input and its output;

configuration switches connected to the VTMs for configuring the VTMs in and out of a series connection;

wherein the apparatus configures the VTMs in and out of the series connection to adaptively adjust the aggregate voltage transformation ratio of the array and regulate the output voltage.

27. The apparatus of claim 26 wherein the configuration switches are connected to the inputs of the VTMs and the VTM inputs are adaptively configured.

28. The apparatus of claim 26 wherein the configuration switches are connected to the outputs of the VTMs and the VTM outputs are adaptively configured.

29. The apparatus of claim 26 wherein one or more of the VTMs further comprise:

a resonant circuit including a transformer and having a characteristic resonant frequency and period;

two or more primary switches connected to drive the resonant circuit; and

a switch controller adapted to operate the primary switches in a series of converter operating cycles, each converter operating cycle characterized by

(a) two power transfer intervals of essentially equal duration, during which one or more of the primary switches are ON and power is transferred from the input of the VTM to the output of the VTM via the transformer, and voltages and currents in the VTM rise and fall at the characteristic resonant frequency.

30. The apparatus of claim 29 wherein:

each converter operating cycle is further characterized by (b) two energy-recycling intervals each having an essentially constant duration over the normal operating range during which the primary switches are OFF; and

wherein magnetizing current is used to charge and discharge capacitances during the energy-recycling intervals.

31. The apparatus of claim 30 wherein the switch controller is adapted to turn the primary switches OFF essentially at times when the current in a secondary winding returns to zero.

32. The apparatus of claim 26 wherein the apparatus senses the array input voltage and configures the VTMs in response to changes in the array input voltage.

33. The apparatus of claim 26 or 32 wherein the apparatus senses the array output voltage and configures the VTMs in response to changes in the array output voltage.

34. The apparatus of claim 26 wherein the array comprises VTMs having voltage transformation ratios that form a binary series.

35. The apparatus of claim 26 wherein the array comprises a main VTM and an auxiliary VTM;

the main VTM having fixed connections to the array input and output; and

the auxiliary VTM being connected between a series-connection with the main VTM or disconnected from the array via the configuration switches.

36. The apparatus of claim 26 further comprising a linear regulator connected between the array output and the load.

37. The apparatus of claim 26 further comprising a linear regulator connected between the input source and the array input.

38. Apparatus for converting power from an input source for delivery to a load, where the load may vary over a normal operating range, comprising:

an integrated adaptive array having an input, an output, a number, N, of input cells each having a respective number, P_x, of turns and a number, M, of output cells each having a respective number, S_x, of turns, where N+M is greater than 2;

magnetic coupling between the turns to form a transformer common to each of the input and output cells;

configuration switches connected to configure the cells in and out of a series connection;

wherein the apparatus is adapted to configure the cells in and out of the series connection such that the turns of selected ones of the input cells are adaptively connected in series and the turns of selected ones of the output cells are adaptively connected in series to provide an adaptively adjustable transformer turns ratio, which is a function of the ratio of (a) the sum of the number of turns in the selected ones of the series-connected output cells to (b) the sum of the number of turns in the selected ones of the series-connected input cells.

39. The apparatus of claim 38 wherein the number, M, of output cells equals 1 and the configuration switches are connected to the input cells.

40. The apparatus of claim 38 wherein the number, N, of input cells equals 1 and the configuration switches are connected to the output cells.

41. The apparatus of claim 38 further comprising:

a resonant circuit including the transformer and having a characteristic resonant frequency and period;

two or more primary switches in at least one of the primary cells adapted to drive the resonant circuit; and

a switch controller adapted to operate the primary switches in a series of converter operating cycles, each converter operating cycle characterized by

(a) two power transfer intervals of essentially equal duration, during which one or more of the primary switches are ON and power is transferred from the input of the integrated adaptive array to the output of the integrated adaptive array via the transformer, and voltages and currents in the adaptive array rise and fall at the characteristic resonant frequency.

42. The apparatus of claim 41 wherein:

each converter operating cycle is further characterized by (b) two energy-recycling intervals each having an essentially constant duration over the normal operating range during which the primary switches are OFF; and

wherein magnetizing current is used to charge and discharge capacitances during the energy-recycling intervals.

43. The apparatus of claim 42 wherein the switch controller is adapted to turn the primary switches OFF essentially at times when the current in a secondary winding returns to zero.

44. The apparatus of claim 38 wherein the apparatus senses the integrated adaptive array input voltage and configures the cells in response to changes in the integrated adaptive array input voltage.

45. The apparatus of claim 38 or 44 wherein the apparatus senses the integrated adaptive array output voltage and configures the cells in response to changes in the integrated adaptive array output voltage.

46. The apparatus of claim 38 wherein the input or output cells comprise a number of turns that form a binary series.

47. The apparatus of claim 38 wherein the input cells comprise a number of turns that form a first binary series and the output cells comprise a number of turns that form a second binary series.

48. The apparatus of claim 38 further comprising a main input cell having a fixed connection to the integrated adaptive array input.

49. The apparatus of claim 48 further comprising an auxiliary input cell being connected between a series-connection with the main input cell or disconnected from the integrated adaptive array input.

50. The apparatus of claim 38 further comprising a linear regulator connected between the integrated adaptive array output and the load.

51. The apparatus of claim 38 further comprising a linear regulator connected between the input source and the integrated adaptive array input.

52. The apparatus of claim 38 wherein

N is at least 2 and at least two of the input cells are arranged in a pair, each pair comprising a first input cell and a second input cell;

the first and second input cells each having a positive-referenced switch and a negative-referenced switch connected to form a double-ended drive for the respective turns;

the respective turns of the first and second input cells being connected to induce opposing flux in the transformer when driven by their respective positive-referenced switches; and

a controller adapted to operate the switches of the first and second input cells substantially 180 degrees out of phase such that the positive-referenced switch of the first input cell and the negative-referenced switch of the second input cell are ON together and the negative-referenced switch of the first input cell and the positive-referenced switch of the second input cell are ON together.

53. The apparatus of claim 52 wherein the switches comprise a maximum voltage rating that is lower than the input voltage.

54. The apparatus of claim 52 wherein N is a multiple of 2 and all of the input cells are arranged in pairs.

55. The method of claim 13 wherein

N is at least 2 and at least two of the input cells are arranged in a pair, each pair comprising a first input cell and a second input cell; and

further comprising:

providing, in each of the first and second input cells, a positive-referenced switch and a negative-referenced switch to form a double-ended drive for the respective turns;

connecting the respective turns of the first and second input cells to induce opposing flux in the transformer when driven by their respective positive-referenced switches;

providing a controller adapted to operate the switches of the first and second input cells substantially 180 degrees out of phase such that the positive-referenced switch of the

first input cell and the negative-referenced switch of the second input cell are ON together and the negative-referenced switch of the first input cell and the positive-referenced switch of the second input cell are ON together.

56. The method of claim 55 further comprising providing the positive-referenced switches and the negative-referenced switches with a maximum voltage rating that is lower than the input voltage.

57. The apparatus of claim 55 wherein N is a multiple of 2 and all of the input cells are arranged in pairs.

58. A method of converting power from an input source at an input voltage for delivery to a load over a normal operating range, comprising:

providing a number, N, of input cells, where N is at least 2, and at least two of the input cells are arranged in pairs, each pair including a first input cell and a second input cell, and each input cell having a respective number, P_x, of turns;

providing a number, M, of output cells each having a respective number, S_x, of turns;

providing magnetic coupling between the turns to form a transformer common to each of the input and output cells;

providing, in each of the first and second input cells, a positive-referenced switch and a negative-referenced switch to form a double-ended drive for the respective turns;

connecting the respective turns of the first and second input cells to induce opposing flux in the transformer when driven by their respective positive-referenced switches;

providing a controller adapted to operate the switches of the first and second input cells substantially 180 degrees out of phase such that the positive-referenced switch of the first input cell and the negative-referenced switch of the second input cell are ON together and the negative-referenced switch of the first input cell and the positive-referenced switch of the second input cell are ON together.

59. The method of claim 58 further comprising providing a half-bridge configuration for the first and second input cells.

60. The method of claim 58 further comprising providing the positive-referenced switches and the negative-referenced switches with a maximum voltage rating that is lower than the input voltage.

61. The method of claim 58 wherein the number of turns in the first input cell equals the number of turns in the second input cell.

62. The method of claim 58 wherein M equals 1 and N equals 2.

63. The method of claim 58 wherein N is a multiple of 2, N is greater than 2, and all of the input cells are arranged in pairs.

64. An apparatus for converting power from an input source at an input voltage for delivery to a load over a normal operating range, comprising:

a number, N, of input cells, where N is at least 2, and at least two of the input cells are arranged in a pair, each pair including a first input cell and a second input cell, and each input cell having a respective number, P_x, of turns;

a number, M, of output cells each having a respective number, S_x, of turns;

magnetic coupling between the turns to form a transformer common to each of the input and output cells;

the first and second input cells each having a positive-referenced switch and a negative-referenced switch connected to form a double-ended drive for the respective turns;

the respective turns of the first and second input cells being connected to induce opposing flux in the transformer when driven by their respective positive-referenced switches;

a controller adapted to operate the switches of the first and second input cells substantially 180 degrees out of phase such that the positive-referenced switch of the first input cell and the negative-referenced switch of the second input cell are ON together and the negative-referenced switch of the first input cell and the positive-referenced switch of the second input cell are ON together.

65. The apparatus of claim 64 wherein the first and second input cells further comprise a half-bridge configuration.

66. The apparatus of claim 64 wherein the positive-referenced switches and the negative-referenced switches comprise a maximum voltage rating that is lower than the input voltage.

67. The apparatus of claim 64 wherein the number of turns in the first input cell equals the number of turns in the second input cell.

68. The apparatus of claim 64 wherein M equals 1 and N equals 2.

69. The apparatus of claim 64 wherein N is a multiple of 2, N is greater than 2, and all of the input cells are arranged in pairs.

70. The method of claim 13 or the apparatus of claim 38 wherein the integrated adaptive array comprises an adaptive VTM array and the adaptively adjustable transformer turns ratio provides an adaptively adjustable voltage transformation ratio, $K = V_{out}/V_{in}$, where V_{in} is the voltage across the integrated adaptive array input and V_{out} is the voltage across the integrated adaptive array output.